



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/581,075

08/29/2006

Hayato Katsuda

Q94853

2096

23373 7590 05/20/2009  
SUGHRUE MION, PLLC  
2100 PENNSYLVANIA AVENUE, N.W.  
SUITE 800  
WASHINGTON, DC 20037

EXAMINER

SHABMAN, MARK A

ART UNIT

PAPER NUMBER

2856

MAIL DATE

DELIVERY MODE

05/20/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/581,075	<b>Applicant(s)</b> KATSUDA ET AL.	
	<b>Examiner</b> MARK SHABMAN	<b>Art Unit</b> 2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/5/08 3/23/08</u>  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1 and 4-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaki (Japanese machine translation provided in previous correspondence) in view of Gehman US PGPub 2005/0081603 A1 (hereinafter referred to as Gehman) in view of Naito US PGPub 2003/0188968 (hereinafter referred to as Naito).

**Claim 1** is rejected under 35 U.S.C. 102(b) as being anticipated by the English machine translation of Isaki JP9021774 (hereinafter referred to as Isaki).

Regarding **claim 1**, Isaki discloses a humidity and gas detecting element as seen in figure 1 of the drawings. The background of the invention on page 9 discloses a conventional gas detection element wherein the gas detection portion "includes a diaphragm structure section" formed of a silicon substrate as claimed. It would have been obvious to use such a detector for the advanced accuracy it provides. The sensor comprises a "gas detection element" 6 (paragraph 0029). A ceramic substrate 8, as seen in figure 3, in conjunction with the holding member 3 (also made of ceramic in paragraph 0013), in figure 1 form a "ceramic wiring substrate" to which the detection

Art Unit: 2856

element is mounted (paragraph 0031). As the total wiring substrate includes a cavity, more easily seen in figure 1b, the gas detection element is mounted in the substrate, below the cap 5, as claimed. A "protective cap" is present as the breathability covering device 5 can be seen in figure 1 which is made of metal as disclosed in claim 5. When the protective cover is attached, a "gas measuring space" is present (seen in figure 1b) and ventilation holes in the covering device allow gas to be introduced to be measured in the gas-measuring space as claimed. Although the protective cap is not explicitly disclosed as "directly attached" to the ceramic wiring substrate as claimed, there are no benefits or advantages present in the application as to why the cover need be connected in such a manner. Any means for attaching the cover to the sensor assembly in order to provide protection of the sensor when in use would be equivalent to the claimed configuration. One of ordinary skill in the art at the time of invention would have been able to modify the apparatus of Isaki to connect the cover directly to the ceramic substrate if so desired. Additionally, the holding part 3 as seen in figures 1 and 2 could have been modified to be constructed from ceramic, and would thus be part of the ceramic substrate, with the cover directly attached thereto as claimed.

Naito discloses a gas sensing element which operates in a similar manner as Isaki's. The substrate of Naito is multilayered ceramic sheets as is known in, and common in the art. It would have been obvious to one of ordinary skill in the art at the time of invention to manufacture the substrate of Isaki in a similar manner since a ceramic substrate would exhibit strong insulating properties thus reducing the chance of error in a gas reading.

Gehman discloses a gas vapor sensor in which a housing and cover are provided where the cover snaps onto the housing to attach it. The housing comprises a recess formed on two sides and the cap comprises a perpendicularly projecting portion which engages into the recess of the housing to secure the cover in place. The cover further comprises an inlet in the surface which allows the gas to enter the sensor for measurement. It would have been obvious to one of ordinary skill in the art at the time of invention to secure the cover or cap of the present invention in a manner similar to that of Gehman to allow for easy removal for access to the sensor and corresponding electronics. Further, as Gehman teaches the use for a removable (non-adhering) lid as shown in figure 1, the variations present in the claimed invention are considered to be a design choice of the applicant and therefore are not found patentably distinct from the prior art.

Regarding **claim 4**, the sensors of Isaki, Naito and Gehman all comprise substrates or corresponding substrate structures of “substantially quadrangular shape” when viewed along the direction of the lamination. Gehman illustrates the recess formed on each of at least two opposed side surfaces. When combined with Isaki and Naoki as previously described, the recesses are located on the ceramic wiring substrate as claimed.

Regarding **claim 5**, the recess of Gehman is formed on the side surfaces of the housing to guide the “projecting portions” of the cover to locations where they are fitted

Art Unit: 2856

securely. In combination with the ceramic substrate as previously discussed, the guides would be formed in said substrate as claimed.

Regarding **claim 6**, the background of the invention discloses a gas sensor including a "diaphragm structure section" and a "gas detection portion" as claimed. Isaki shows in figure 1 a "plurality of gas intakes" formed in the cover opposite the surface of the ceramic wiring substrate. It would have been obvious to one of ordinary skill in the art at the time of invention to arrange the intakes of Isaki in a manner which would allow air and gas to enter the sensor but not cause damage to the detector or diaphragm due to a potential burst of air through the openings. To ensure this does not occur, one would arrange the intakes so they are not directly overhead of the detection elements which could be in a number of configurations, thus making the gas detection element "invisible" when viewing through the cover.

Regarding **claim 7**, Isaki illustrates in figure 3 electrodes 9-13 located on the substrate as part of the gas detection element (paragraph 0031). The electrodes are connected to the lead frame 2 via wire bond 7 (paragraph 0035). Since the gas-detection element is connected to the substrate it would have been obvious to one of ordinary skill in the art at the time of invention to connect them via "connection portions" or any other means suitable which is known in the art. The separation of two pieces and subsequently reconnecting them in such a manner is common practice. It would have been obvious to one of ordinary skill in the art at the time of invention to conceal the "connection portions" from view through the top cover by segregating or covering

Art Unit: 2856

them separately to avoid any potential corrosion from forming on them and causing destruction the sensors

Regarding **claim 8**, Naito discloses layering ceramic sheets as substrate thus any wiring of the substrate would be sandwiched in between. Since substrates are used for "wiring" of electronics, it would have been obvious to one of ordinary skill in the art at the time of invention to connect electronically any pieces of the substrate which need to be in communication with one another in a similar manner. Since a diaphragm works under the principle of a changing pressure and is located between two chambers in order function, it would have been obvious to one of ordinary skill in the art at the time of invention to form a recess in the lower or opposite layer of the substrate to allow for the diaphragm to function properly.

Regarding **claim 9**, the "gas detection element of Isaki is located on the top side of the ceramic substrate and thus there exists a bottom surface on the opposite side which is "substantially planar". Outer electrodes 2 are present which allow the sensor to be connected to a circuit board. While it is not explicitly shown, it would have been obvious to one of ordinary skill in the art at the time of invention to construct the electrodes as forming from the bottom of the substrate as they are to be attached to the circuit board below the sensor.

**Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Isaki in view of Gehman in view of Naito US PGPub 2003/0188968 as applied to claim 1 above, and further in view of Gole US Patent 6,893,892 B2.

Art Unit: 2856

Regarding **claim 10**, Isaki discloses the invention in its entirety with the exception of a plurality of gas detection elements which respond to different gas species. It was known in the art at the time of invention to include multiple sensors within a gas detector to detect multiple gases without the need for additional sensing units. Gole teaches using series of gas sensors mounted on a substrate to detect multiple gases (i.e. gases associated with engine exhaust) in a single sensor (column 17 line 64). Further, it would have been obvious to one of ordinary skill in the art at the time of invention to add a second, similar sensor for detecting a second gas in the same manner as the first, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USP 8.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1 and 4-10 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARK SHABMAN whose telephone number is (571)270-3263. The examiner can normally be reached on M-F 8:00am - 4:30pm, EST.



Art Unit: 2856

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Hezron Williams/  
Supervisory Patent Examiner, Art  
Unit 2856

/M. S./  
Examiner, Art Unit 2856